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ABSTRACT

A case study was made of the implementation of an innovative measurement program. In this instance, curriculum implementation was seen as a process in pedagogical, occupational, and sociocultural contexts in which social groups with unequal power, and in contradictory ways, contended for control. "Beyond academic achievement" emerged as a theme underlying the knowledge being distributed by the school. Six subthemes are analyzed: (1) the controlling influence of middle-class ideology; (2) curriculum and organizational fragmentation; (3) how the school muted academic competition to the advantage of middle-class students; (4) instructional processes that contributed to an unequal distribution of knowledge; (5) instructional processes that contributed to and effectively masked an unequal distribution of knowledge; and (6) forms of control, resistance, and compliance. Conclusions are made on parent participation and social class, and power and curriuclum development, both of which clearly point up differences in perspectives on curriculum implementation. Two pages of references are included. (Author/TE)

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Power and Curriculum Implementation: A Case Study of An Innovatory Mathematics Program

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EA 017 302

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Abstract

The purpose of the study was to describe and explain the implementation of an innovatory measurement program at elementary level in terms of power. Curriculum implementation was seen as a process in pedagogical, occupational, and social-cultural contexts in which social groups with unequal power, and in contradictory ways, contested control.

The site for the study was an inner suburban Melbourne school which was classified by the Australian Schools Commission as disadvantaged. Students were from diverse ethnic and social class background.

An ethnographic approach was employed with knowledge and work as orienting constructs.

During the study 'Beyond academic achievement' emerged as a theme underlining the knowledge being distributed by the school. The meanings of achievement were, however, contested and contained contradictions in practice. Six subthemes were analyzed. The first pointed to the controlling influence of middle-class ideology. A second was curriculum and organizational fragmentation. The third analyzed how the school muted academic competition to the advantage of middle-class students. The fourth and fifth subthemes explored instructional processes which contributed to, and masked, an unequal distribution of knowledge. In the sixth, forms of control, resistance, and compliance were analyzed.

Conclusions were made on classroom relations, the contestation within the occupational community over appropriate knowledge, parent participation, measurement as knowing and doing mathematics and power and curriculum development.

Impediments to 'successful' implementation of innovatory school programs have been much discussed in recent years as researchers from different paradigms have sought to illuminate issues of curriculum change. It needs to be clear that underlying the methodological practices are distinctive ideologies involving, for example, beliefs in what questions are relevant and assumptions of what counts for knowledge and the work conditions appropriate to its acquisition. The major paradigms, however, contain serious limitations in grappling with issues of curriculum change.

The dominant research paradigm has focused on curriculum implementation as product. Fullan and Pomfret (1977) labelled it a fidelity orientation. Change is measured in terms of the extent to which the actual use of an innovation corresponds to designers' intentions. Researchers within this view usually assume knowledge to be observable, and the social world to be composed of elements or variables which are identifiable and capable of study within a system defined to reveal their interrelationships. In this view, for example, 'successful' implementation might be measurable in terms of a dependent variable such as achievement of particular, prespecified objectives. This assumes, however, that teachers are passive objects having very limited autonomy and expertise and needing direction and control.

Some who challenge the dominant view of curriculum change see it as obscuring the human relationships necessarily embedded in the knowledge and work associated with a curriculum implementation process. House (1974), for example saw curriculum innovation as involving conflict and compromise among factional groups such as designers, teachers, administrators, parents, and governments. The study of personal contacts was seen as essential in investigations of curriculum change. Researchers within this paradigm have analyzed diffusion of innovations showing them to be shaped by opportunities and impediments to contact (e.g., HOuse, 1974). Other findings identify adaptations made to innovations in the context of a school (e.g., Shaw, 1975). Such views of curriculum change fail, however, to take into account the world of political and economic concerns, and hence, limit our understanding of particular conceptions

of knowledge and work which, through history, emerge in a world beyond classrooms and schools.

There are recent studies (Anyon, 1980, 1981; Popkewitz et al., 1982) in which wider political and economic perspectives may be related to the curriculum change process in schools. Anyon's (1980, 1981) ethnographic studies shed light on how curriculum implementation might be related through differing social class practices of school work and knowledge to wider political and economic predicaments. Popkewitz et al (1982) gave meaning to curriculum change in terms of three contexts in which it was seen to be located: the pedagogical, occupational, and social-cultural. The pedagogical context was defined as those patterns of conduct produced by particular conceptions of school knowledge and work. The occupational community of teaching - administrators, teachers and students - was considered a social group maintaining ideologies and means of legitimating its behaviour while situated in larger social and cultural conditions. The social-cultural context referred to the community in which the school is located and is concerned with the relationship of the community's social-cultural, economic, and political life as it affects school practices.

Popkewitz's (1981) discussion of contexts is useful in giving focus to how researchers' assumptions guide them in choice of appropriate parameters for understanding and explaining social conduct and so having different policy implications. In the dominant view of curriculum change, barriers to implementation of innovations are seen as intervening variables between the adoption and attainment of desired outcomes. The way to remove these barriers is seen to lie in changing incentive structures and management strategies because of adopters' resistance. In research where curriculum change is characterized as involving conflict and compromise among factional groups, or as "mutual adaptation" (McLaughlin, 1976) through which designers, adopters, and the innovation itself all change in mutually beneficial ways, suitable implementation strategies are seen to be in participative decision making and collaborative forms of curriculum development (Fullan & Pomfret, 1977).

The approach taken in this study was to view curriculum implementation in terms of power relationships. Participants in the implementation of an innovatory mathematics program were seen to be differentially positioned in such terms. There are two aspects used in understanding

power. One aspect recognizes power through the ability of some to define reality for others (Keddie, 1971). For example, a principal might attempt to influence actions of teachers by using his/her authority position in the occupational power structure as support. Also, importantly, power is manifested through the physical context of schooling, the material and organizational outcomes of social-cultural contests in history. The second aspect is more subtle. Sharp and Green (1975) describe it as conditions acceptable to participants but defined within parameters of negotiability. An instance of this is where structural constraints may operate in seemingly natural forms such as teacher consciousness that categorizing students in ability groups to cater for individual differences is an efficient and effective instructional procedure. The two aspects of power involve, respectively, force and consent. Giroux (1981) points out that in this duality consent is the prevalent condition. Consent is unlikely to be total however, and in its working out involves tensions, contradictions, and resistance. Workers, including teachers and students, are not passive bearers and receptors of knowledge but are 'active appropriators' (cf. Connell, Ashenden, Kessler, & Dowsett, 1982). There is some space or relative autonomy for participants. At the worksite,

> Workers...attempt to create informal conditions to gain some measure of control over their labor, to establish some serious sense of informal power over time, pacing, and employment of their skills. (Apple, 1982, p.95).

Through this 'radical' perspective (Papagiannis, Klees, & Bickel, 1982), classroom and school practices and relationships were examined in interrelationships with elements of their social-cultural context. The approach addressed the question of "Who benefits?" rather than "To what degree is the curriculum implemented?" in attempting to illuminate issues of curriculum change. The fidelity and mutual adaptationist perspectives appear to have taken a neutral stance in decision making, and while addressing issues of structural imperfection masked differential benefits gained by particular social groups. A radical perspective makes power relationships and social interests explicit.

Research Strategy

The purpose of the study was to describe the process of implementation of an innovatory mathematics program as it was given meaning in the everyday life of participants in an elementary school, and to explain these meanings in terms of power relationships between elements of pedagogical, occupational, and social-cultural contexts. To capture this complexity I combined an ethnographic approach with an analysis of social-cultural arrangements through which everyday life was seen to be dialectically linked with unequal social conditions. Willis (1977) recommends an ethnographic approach which has

> a sensitivity to meanings and values as well as an ability to represent and interpret symbolic articulations, practices and forms of cultural production. In particular the ethnographic account, without always knowing how, can allow a degree of the activity, creativity and human agency within the object of the study to come through into the analysis and reader's experience. This is vital to my purposes where I view the cultural, not simply as a set of transferred internal structures...nor as a passive result of the action of dominant ideology downwards...but at least in part as the product of collective human praxis. (pp.3-4)

For these reasons an ethnographic approach was also appropriate to the present study in which constraints, consent, and resistances are elements of power relations through which knowledge and work in the curriculum process is rejected, mediated and transformed, often in contradictory ways.

School and Setting

The school I chose for the study was situated in inner-suburban Melbourne. Melbourne is a large, sprawling metropolis with a population approaching three million people. The suburb of Middleton in which the school is located was established in the 1840's as a dormitory for workers who were employed in factories set up in the area. Since World War II, with massive immigration programs, the ethnic backgrounds of people in the inner-suburbs have changed dramatically. As large numbers of the

population with predominantly British-Irish backgrounds moved to outer suburbs during the economic boom period circa 1950, there was an influx of European immigrants to the Middleton area. These became the manual and process workers whose goal was to accumulate sufficient money for a deposit on land and a house in outer Melbourne. During the 1980's, a new class moved into the area. These were professional people who established 'town houses' close to their offices and Central Business District. Humble Street, as the school will be called, may be seen therefore, as being at the center of a diverse community encompassing a broad range of cultural and economic backgrounds.

Data obtained from Humble Street school enrollment cards (N=195) indicated that either one or both parents from 138 families were employed. In 25 percent of these families both parents were working, although not necessarily full time. Of the remaining 57 families, in 38 cases parents were on Social Security pensions, and in 19 cases were unemployed. Of the 195 families, 40 percent were single parent families.

There were 234 children enrolled in Prep to Grade 6. In Table 1, children are classified under two dimensions: social group and grade level. 'Trendies' or educated professionals (e.g., teachers, attorneys) are distinguished from the working class (e.g., factory workers, trades people). The working class are classified as first and second or more generation Australians. The first generation are analyzed one step further as being of either Greek or non-Greek origin (principally Middle East) Italian, Vietnamese, Indonesian). The second dimension, grade level, is shown by three headings: lower, middle, and upper. These correspond to grades P-2, 3-4, and 5-6 respectively. Statistics are given as percentages (to nearest whole number of children enrolled at each level). This data shows that children entering the school in the lower grades were increasingly from the 'trendy' or educated professional group. There was a decline in the number of children of Greek origin.

The changing population of the Middleton area was evident in its effect on the composition of the school council. The council was made up of 14 voting and two non-voting members. The 14 voting members comprised 4 elected members of the teaching staff and 10 elected members

of the community. The two non-voting members were the principal and community education officer. All 10 community members had professional occupations. Seven of them were female; at least eight had tertiary qualifications; only one had lived in the area for more than 10 years; all were at least second generation Australians; and eight were parents of at least one child in the lower grades.

The school had been declared by the Australian Schools Commission to be 'disadvantaged'. The Disadvantaged School Program is a Federal Government policy of positive discrimination" to help students who faced situations less favorable to learning" (Commission of Inquiry into Poverty, 1976, p.3). The program operates, however, through a framework of identifying disadvantaged schools rather than disadvantaged children. The stated purpose of the program was

> to 'supplement' funds for schools serving Australia's most underprivileged neighborhoods in order to increase educational opportunity, making school more meaningful to students and to encourage these schools to become more open institutions linked with their communities. (Schools Commission, 1975, p.62).

These grants, channelled through State Education Departments, have provided aid to improve buildings, supply equipment, and to encourage experimentation with new teaching approaches. Approximately one in six schools in the State has been declared disadvantaged. Supplementary funds for these schools has not been distributed evenly across them because of the project-based nature of funding according to what the Schools Commission (1979) describes as the quality of proposals and to relative need of schools. The Commission of Inquiry into Poverty (1976), while recognizing the important impact of supplementary grants on schools previously starved of resources, also points out that

> powerful factors both within the schools and within our society still operate to impose severe handicaps on poor families. (p.4)

By poor the Commission meant the group of people disadvantaged by a relative lack of power and choice because of their position at the bottom of the social scale in terms of their income, occupation, status, and respect. Humble Street would seem to have been classified by State Education authorities as one of the poorer schools, certainly one of the most

disadvantaged. Some schools in the Middleton area were rated as the most disadvantaged in the State. The region in which Middleton was located had more disadvantaged schools in it than any other region in the State. Humble Street school was rated by State authorities in the upper third of most disadvantaged primary schools in its region.

The Mathematics Program

The mathematics program was developed at the central curriculum office for the State of Victoria, namely the Curriculum Services Branch of the Victorian Education Department. This program has been the major elementary curriculum work in mathematics developed and disseminated by the Curriculum Services Branch in the period 1972 to 1981. The program is confined to measurement and has been developed around nine topics: area, length, mass, money, perimeter, spatial relations, time, visual representation, and volume. A booklet was produced for each of these topics and a further booklet, 'A Manual for teachers', briefly describes the philosophy behind the program and suggestions for its implementation.

Each of the topic areas was developed around the premise that children learn by doing (Primary Mathematics Project Team, 1981a). The booklets emphasize the importance of providing activities for individuals and groups to work at both in and outside the classroom. Extensive use is meant to be made of manipulatives. No grade levels are specified for subtopics but suggestions are given for how 'appropriate' starting points may be located. The program is open to organization by a single teacher within one or more classrooms and by several teachers across many classes or a whole school. It is assumed the teacher or teachers have control over the selection and organization of the program but this may be relaxed by providing for differential pacing by students. Activities are, in general, open to some student control. For example, in the Spatial Relations guide (Primary Mathematics Project Team, 1981b) it is suggested that students investigate shapes around them by using squares and circles to make pictures (Activities SS4 to SS8), draw their own house plans (Activity SL.43), or make a map of their own locality (Activity SL.53). Suggestions are given for details that might be included. Solutions and outcomes are, in many cases, only assessable within the extensions decided on by standards. Few activities are of a type where the numerical answers have been predetermined.

Beyond Academic Achievement

Like other schools Humble Street Elementary School is being opened to greater public scrutiny and to parent participation in decision-making. It has had a marked decline in student numbers in recent years, and felt the influence of increasing teacher unionism over the past decade. As a declared disadvantaged school it has, within the decade, been overwhelmed with state funding for extensive capital works, and increased staffing to meet 'special needs'. Also within the same decade, it has experienced the shrinking of that funding as it endeavoured to adapt to changing social-cultural conditions.

The school presents an image to the community of an institution working to meet its 'needs', to be considered by the community as 'our school', and to ensure 'indepth learning' for its students through 'child-centered' programs. The symbols and discourse of the school also present it as an institution working in an environment that is economically, socially, and culturally deprived. 'Beyond academic achievement' was a theme underlining the knowledge being distributed by the school. The theme gave focus to understanding and explaining the transformation of the mathematics program in terms of power. Six subthemes are analyzed in terms of power: Enrichment for basics, curriculum and organizational fragmentation, Doing your best, Differential instruction, Limiting possibilities, and Control, resistance, and compliance.

Enrichment for Basics

The innovatory program in elementary measurement at Humble Street was set up through funds from the Disadvantaged School Program as 'Enrichment Mathematics' to "improve ability and relate ability to skills necessary for living in an inner suburban area". The school program was initiated by two middle-class parents who had backgrounds in mathematics education and saw an opportunity to relate Supplementary Grants from the state, an innovatory program in mathematics, and a school's lack of material resources in mathematics, to the schools designation as disadvantaged. I suggest there are conflicting notions of achievement embodied in 'enrichment' and 'basics' which relate to social class.

An 'enriched' curriculum suggests an addition of high value or quality, an indepth treatment and increased variety of experience. On the other hand, a 'basic' curriculum suggests the minimum requirements and fundamental experiences. In an enriched mathematics curriculum, the existence of basic skills and experiences is generally assumed, enrichment implying additions such as creative activities, problem solving exercises, or opportunities for exploring further mathematical relationships. However, the dichotomy of curriculum into basic and enriched is artificial, although potent, as their separation is reified and becomes associated with different work practices.

The very notion of an enriched curriculum seemed to be linked with a middle-class view of schooling. Enrichment mathematics was but one of several enrichments at Humble Street, others being creative dance, a bilingual program, drama, music, and clubs. Middle-class parents, whom I interviewed, expressed the importance of enriched or extended experiences. One parent asserted:

> Obviously they've got to learn to read and write and have a certain discipline in their minds. I think it is very important for them to have a very open learning. They should see lots of views of lots of different aspects of life as far as it can be incorporated into the time they have.

Another middle-class parent commented:

> So I'm not so much worried about how they're taught, whether the computer way, or the long division way, or another form, as long as they understand there are other ways of it happening, and they don't get caught out in "There is the one and only way". Their minds then are not open to search out other ways in which we can work out maths.

Although the middle-class or 'trendies' were only approximately one quarter of the population of parents, the principal attested to their influence as they occupied all parent positions on the school council:

> The power of the school council is definitely increasing, that is, their desire to direct the education of the children is definitely increasing.

In contrast to this, the working-class parents whom I interviewed emphasized the importance of accepting authority, a moral code, and the learning of basic skills. One parent said,

> If they're told to be quite I just hope my kids behave well. I think that goes a long way when they grow up as a citizen. Learn right from wrong. On the reports, to me, behaviour goes a long way.

A parent of Greek origin commented,

> If you go in the rooms in Greece everybody sit quietly. No talk, just listen to teacher. But me, I go sometimes into rooms here I see kids play here, play here, play here. If you are in Grade 2 in Greece you understand everything in times table. How many twos in two. And my daughter now in Grade 4 and she still no understand tables. Maybe my fault my kids, I don't know. But you go by the room I see many difference. Teacher ask here how many five in five. They count on fingers. Maybe that allowed for mathematics. You see little things - count one, two, three. I see how many plus five plus five. That's nice for them Grade, 1, Grade 2, but not for Grade 5, Grade 6.

The mastering of basic academic skills was a dominant concern for the working-class parents, while for the middle-class parents socializing experiences and 'learning being exciting' were most important in the elementary school. Middle-class parents tended to break down divisions between work and play in schooling so that the idea of 'enriched' learning experiences were clearly an integral part of the curriculum. School and extra-school knowledge were seen to significantly overlap. For working-class parents, school was a workplace and play was for outside of school time. Homework was only tolerable if the schoolwork of a child was below standard. However, for Greek working-class parents, homework not only assisted children to reach standards necessary for continued schooling but linked school to home by giving parents an opportunity to be familiar with the knowledge and work distributed by the school. Teachers were aware of the Greek parents' concern but generally did not respond to it or, when doing so, directed students to learn certain routines and facts which were

likely to satisfy the parents. Thus the Grade 6 teacher stated she would

> get the kids to...learn tables and do automatic response things. Some of the parents think the kids should have homework, especially some of the Greeks. They get homework from the Greek school and they think they should have homework here.

The teachers' and middle-class parents' views that there should be little homework was consistent with their notion that a major role of an elementary school was to provide opportunities for children to socialize.

A view of the measurement program as providing enrichment is, I contend, a middle-class conception of appropriate mathematical knowledge. It is closely related to views of authority and moral purposes of schooling, and has implications for in-school and extra-school work-play experiences. The working-class view was that schools function as workplaces where basic skills are learned within a strong moral framework in which responsibility to, and acceptance of, authority is emphasized. For the middle-class, schooling serves a predominantly socializing purpose in which school and home are mutually supportive. The school was seen as a microcosm of the community, where children learn such attitudes as tolerance and appreciation within an environment that is enriched by a wide variety of experiences. The working-class parents did not value knowledge any less than the middle-class parents. However, the particular knowledge each class held to be important, and the work conditions considered suitable for its appropriation differed. It would be fallacious to ascribe certain views to a social class as though that class constituted some homogeneous grouping having the same orientation to knowledge and work. While, for example, there were similarities in working-class views on homework, there were also differences. What is important to the present study is that working-class parents did have strong views on appropriate knowledge and work for school mathematics as well as other disciplines. These did not impact on the development of recent innovatory programs as did middle-class views and action. However, although middle-class parents were dominant on school curriculum committees and were able to win funding for 'Enrichment Mathematics' and other projects, this did not ensure that the programs were enriched in practice. There was some consonance between staff and middle-class parents in their view of elementary schooling as primarily a socializing experience. But there were contradictory

elements in the meanings teachers gave to 'Enrichment Mathematics'. While enrichment was being spoken of on one hand, fragmentation of curriculum and organizational arrangements had worked transformative effects on the measurement program at Humble Street.

Curriculum and Organizational Fragmentation

A former classroom was set aside as a store for mathematics resource materials and as the site for the mathematics teacher aide to teach measurement to small groups of children. The decision by the principal to implement the measurement program in this way recognized curriculum decisions as lying with individual teachers. The program, initiated by parents as an enrichment program and funded through Supplementary Grants was not imposed on teachers. Over the period 1981-1982 the program moved from involving one class to all classes in the school. A benefit to teachers who joined the program was that they could work with a small number of children remaining in their class after sending half to the math room. Some teachers used the time as free time for students, others for more relaxed communication with students on a one-to-one basis. Sometimes it was used for more pure number work. Teachers who chose to do measurement activities either during that time, or at other times with their whole class, selected activities which generally required just pencil and paper, or simple manipulatives such as rulers. Thus the measurement program, which was already separated from pure mathematics, was fragmented in content by a division of pencil and paper activities from activities requiring more elaborate materials, and fragmented in the school organization where it was largely associated with the activities in a separate room with a different teacher.

The measurement course was already reified as a distinct part of mathematics before being implemented in the school. This occurred because, historically, mathematics has been seen as 'pure' or 'applied'. The division was maintained in the elementary mathematics curriculum while at the same time designers' and teachers' discourse contained frequent reference to integration. The meaning given to integration however was more a cross-referencing within the constructed fragmentation of school mathematics, than related to a wholeness between the student's everyday knowledge and the domain of school mathematics. Such a meaning

promoted teacher control of knowledge and set limits on an open-ended, problematic knowledge in which students had a measure of control.

Dividing 'Enrichment Mathematics'

The measurement program, published in a series of 10 booklets, was a collection of activities under separate measurement headings. Teachers saw their role as selectors of appropriate activities for students to solve. One teacher commented, "It's easy to teach. It's like, Here it is here, and there are your activities you can do." With measurement materials organized as discrete activities, any activity could be selected for a particular time slot. A single lesson might then require the selection of one or two activities while a group of lessons would require further activities. This facility with which activities could be selected for lessons was important in the organization of the measurement program in the school. Because of the physical insularity of teachers, each in one classroom, and because of their curricular insularity, in which there were few curricular exchanges beyond necessary management arrangements, a measurement program of discrete activities made minimal intrusion on the organizational time of teachers. Individual teacher control over his/her mathematics program remained.

Another way in which the measurement program, as a collection of activities, matched the school organization and made minimal intrusion was in the rooming and scheduling of class groups. Classes were assigned to the mathematics room for measurement activities for a period of one hour per week. For each student, however, this meant attendance in the mathematics room for one hour every two weeks. Continuity was not possible in such circumstances. But continuity was not seen to be necessary in the learning of measurement. In each of the three sample organizational plans presented by inservice consultants it was suggested that one day per week be set aside for measurement. Two of the plans suggested 'covering' a different aspect of measurement each week, the third suggested spending one day per week for two weeks on each topic. This third plan was followed in teaching measurement in the mathematics room at Humble Street. Thus six or seven topics were allocated to each term, and since a measurement lesson generally involved one activity, for a student to 'cover' a topic meant to be given the opportunity to engage in approximately three activities in that topic for the year.

Division of teacher labor

Teachers gradually responded to the opportunities for teaching measurement through a teacher aide who would take a small group in the room set aside for measurement. Beginning with just one teacher cooperating, by mid-1982 all teachers were involved. Since teachers had, in large part, not gone beyond measurement activities involving pencil, paper, and simple manipulatives such as rulers, the introduction of the measurement program to the school enabled them to give their students exposure to measurement activities using more equipment, but without themselves having to oversee those activities. What had been a tacit division in teacher labor on measurement became more formalized as teachers passed over responsibility for most work on measurement to the teacher aide with minimal alteration to their own programs. In addition to a division of labor between pencil and paper activities and activities requiring more elaborate materials, at the Grade 6 level, 'Enrichment Mathematics' was further divided with problem solving being identified as a component. Students were bused to a neighbouring school's 'Task Center' on one day per week to engage in 'problem solving situations'.

The division of teacher labor was not simply an arrangement under which measurement was to be taught in large part by the teacher aide in the mathematics room, and pure mathematics and some measurement in the form of pencil and paper activities were to be taught by the classroom teacher. Differential importance was attached to these, with classroom teachers retaining control over what they considered the more important. In general, students viewed measurement as fun, and not really mathematics. During a lesson on spatial relations, in which a group was working on a Pattern Jigsaw, one boy commented that "this is better than doing maths". Classroom teachers, in reporting students' performance in mathematics, did not incorporate any assessment of measurement skills or concepts. The Grade 6 teacher stated that the format of the report card was the reason:

> The way the report card is printed doesn't allow scope for differentiating pure maths from measurement at all.

There was a clear contradiction between the discourse on integration and the practice of fragmentation in the curricular and administrative arrangements of the school. The measurement program, viewed as a collection of activities, fitted such arrangements. This happened largely through

a fragmentation process in which the school was able to control the implementation of the program in ways that maintained its curricular and administrative arrangements.

Doing Your Best

The principal and teaching staff expressed in interviews, school documents, and teaching practice, their belief that schooling give emphasis to aims 'beyond academic achievement'. They viewed a child-centered curriculum as fundamental and the school practice of accepting a broad range of work behaviors and outcomes as being consistent with this. There was a strong sense that the school should be an environment in which students were encouraged to develop self-esteem and confidence, and not be subjected to stress and failure. There were certainly contradictory beliefs and practices involved in this, but there was evidence of clear intent to discover and promote positive characteristics of individual students. There was a consciousness that 'everybody can only do their best'. I suggest 'doing your best' can be seen as an ambiguous attempt to mute academic competitiveness in a disadvantaged school setting.

Deprivation and academic achievement

The principal and teaching staff were very conscious of the Middleton area, in which the Humble Street school is located, as a deprived environment. The principal's response, in this predicament, emphasized extra-school knowledge or what he termed 'beyond academic achievement'. He believed that academic achievement had been divorced from more human pursuits, such as living in harmony with, and caring for, other human beings. At a staff meeting he stressed the importance of 'nonacademic' achievements and pointed to deficiency being in the lack of nonacademic, more so than academic, behaviors. He exemplified this with reference to school mathematics:

> There are countless human beings who are taught to read and write yet go through adult life using these skills hardly at all. A majority of children flounder through mathematics, it plagues their lives, and they use this science very little between the school and the grave. One of the greatest arguments that can be arraigned in favor of education beyond academic learning is the appalling state of manners in society today. Manners have deteriorated alarmingly. We can put men on

> the moon but we can't teach people to shut doors when they need to be shut, to show kindness to old age or infirmity.

Teachers had a strong sense of the negative images students had of themselves and saw their work, in responding to students' needs, as necessarily involving the creation of a less stressful and a less academically competitive environment.

Relaxed achievement

The measurement program, with its practical orientation to learning, was part of the school agenda in which students engaged in mathematical activities in an atmosphere relatively free from school pressures for academic achievement. There were three ways in which pressures to achieve were relieved. Firstly, student performance on measurement activities was neither informally recorded by teachers during the conduct of the activities, nor was it, in general, assessed more formally through pencil and paper tests. Secondly, apart from the exception just noted, measurement was not incorporated in any overall student assessment in mathematics. Thirdly, students were annually promoted from one grade level to the next regardless of mastery of the stated minimum grade expectations or other forms of academic achievement. This practice was deplored by the District Inspector in all five of the school reviews he conducted in the period from 1975 to 1982.

Differential Instruction

Individualized instructional procedures were employed by teachers in ways which gave meaning to student achievement as 'doing your best' or 'doing what you can'. This was not the official language of the school but captured meanings teachers gave to academic achievement. The District Inspector strongly criticized the school for not differentiating instruction to meet the diverse needs and abilities of students. In fact, teachers did differentiate instruction in the mathematics room in which there was no streaming, and in classrooms in which children were grouped according to teacher perceptions of their ability.

In the official language of the school great emphasis was placed on catering for each child as an individual. Reference was made throughout the school policy to 'the child' and 'each child', giving a sense of the

worth, uniqueness, and potential of students. In the school's own evaluation of its ongoing programs, the principal and teachers referred to strategies they employed in individualizing instruction. 'Catering for individual differences' in all cases referred to academic outcomes and not 'beyond academic achievement'. The official discourse made explicit a belief that streaming or ability grouping ensured individualized learning.

There was differential instruction for measurement activities in the mathematics room. Groups of students sent to the room were small in number, sometimes the designated ability groups of classroom teachers, and at others apparently random selections of students. The teacher aide in the mathematics room saw her role as a selector of activities, organizer of appropriate materials, and guide to students. In her interaction with students she responded differently to boys and girls, the interested and uninterested, and the 'brighter' and 'slower' students. In giving greater time to interaction with interested students, the teacher aide was largely interacting with girls and compliant boys, high achievers more so than the 'lower', 'slower', and 'underachievers', and with students of middle class - professional background more so than working class. The form of differential instruction, to which I allude here, was one which reinforced the irrelevance of measurement and school mathematics for many students, predominantly working class. The teacher's recognition that some students were not interested in measurement work was related to their 'problems'. There was certainly a sympathy towards these children, but their 'problems' were viewed as being so embedded in their social predicament that the most useful way to assist them was by a relaxed academic environment which would alleviate stress and failure.

Limiting Possibilities

The school practices of differential instruction, 'doing your best', and providing enrichment, gave an aura of possibility for students of all social classes. The possibilities for working class students were, however, limited in the very opportunities that the school seemed to promise.

Teachers in all classes viewed themselves as providing for individual differences by grouping students according to their mathematical ability. Because reading was seen to be necessary in mathematics learning, grouping

for language and mathematics tended to be the same. Students in all classes were organized into three groups: lower, middle, and upper, and were generally designated by a color so as not to stigmatize the lower group. Different work was assigned to each group, sometimes in the form of different topics; at others all did the same topic from worksheets on which the teacher had graded the exercises by difficulty.

Teachers seemed to accept children's capabilities as natural or, particularly in the case of working class students, so socially and culturally bounded as to be less responsive to instruction than in the case of middle class students. The everyday response of teachers to what they perceived as the deprived background of working class students was to define the 'problem' in deficit ability terms over which they had little control. The Grade 6 teacher described one student as "knowing his tables, but he's not outstanding at anything else". A different teacher described the same student as lacking ability and likely to go to the local technical school rather than high school. Another student was tested by a 'special[illegible]c teacher' and diagnosed as having a short term memory problem.

There were several ways, within the instructional process, that teachers dealt with deficit abilities, ways that would not be 'destructive' to students' confidence. One was to group students by 'ability'. A second way was for teachers, in whole class instruction, to direct simple questions to the 'slower' students and more difficult questions to the 'quicker' and 'high achievers'. Such questions served a twofold purpose for teachers - firstly they were aimed at improving the self image of a student and, secondly, were intended to control the class by the use of a positive approach to keeping students on-task. A third approach was to assign procedural work to 'low achievers' while organizing procedural and creative work for 'high achievers'. Most work in measurement and other mathematics was, however, procedural. Even weighing activities were routinized by the teacher's requirement that students verbalize their results in a particular formula: "They are equal. There are four soda bobs equal to three soda bobs and two crayons". Rather than having students involved in creative activities, it was more usual that the level of teacher directiveness varied. 'High achievers' were given fewer directions than 'low achievers'. A fourth way in which teachers

attempted to improve student confidence was to give them praise for some facet of work, particularly in the case of 'low ability' students. Praise was given for neatness, persistence, and improvement. At an assembly all the students in Grade 6 were praised for the class, and individual, achievement on a mathematics test. My notes of the assembly record the following points:

> He said that the average mark of 69 percent was excellent. Also, four students had scored in the 90s, which helped lift the average. Even the person who got 53 percent, he said, did well "for them".

This form of corporate and individualized commendation masked an unequal distribution of mathematical knowledge and contributed to a tacit approval of the way in which it had been distributed.

This was demonstrated by social class differences in approaching secondary schooling. Students progress from Grade 6 to secondary schools which have markedly different retention rates through to grade 12. The 'high achievers', in general, enter private schools or the more academically oriented high schools which have high retention rates. 'Low achievers' enter the local technical and high schools which have lower retention rates. This was associated with different understandings parents had of the school system. The working class parents tended to rely on the judgement of the teacher. The choice of middle class parents was based on their familiarity with the curricula of a variety of schools, the high academic expectations they had of their children in secondary school, and their children's academic attainment in elementary school. Working class parents did not enjoy any of these advantages.

Control, Resistance, and Compliance

Control in the form of overt disciplining of students was absent from the school. There was no corporal punishment. Social interactions were generally relaxed within the pedagogical context. At the same time, however, there were considerable organizational and physical constraints on students in such forms as timetabling, seating arrangements, and permissions required for unscheduled activities such as going to the toilet. In large part these controls were tacitly accepted by students. Also, there was a pressure on students to conform in the interests of group harmony and group purpose as though each of these were unitary.

An important part of classroom life was, however, the various forms of resistance demonstrated by students in the face of authority, the accommodations made between teachers and students, and the strategies employed by teachers in dealing with the students they perceived to be most resistant.

The examples given in this section illustrate that within the tolerances permitted by teachers, principal, school council and, ultimately, the state, teachers were definers of what were 'right' behaviors. As well as exercising control through formal schooling arrangements, they also made tacit work agreements in the form of soldiering and doubling up, and responded to cases of work stoppages. In dealing with students perceived to be the 'most troublesome', the strategy of teachers was to socially isolate them. Teachers also demonstrated resistance and attempted, through 'coloring in the day', to make their day, and that of their students, more tolerable.

Teachers as definers of right

Within their own classrooms teachers defined what was 'right' knowledge. A requirement for 'right' knowledge was that students be both 'correct' and formulate their behaviors in accord with the teacher's intention. An instance of this was where the Grade 2/3 teacher was giving a lesson on the calendar. The lesson was based on measurement of time activities for the objective 'The calendar as the visual representation of a year' in which particular years were not indicated. The teacher had adapted the ideas of these activities to a form in which she could check whether students' answers were right. The following account is taken from observation notes:

> Teacher gave out duplicated calendar and sheets of questions. She asked individual children to read questions aloud - "This is so you will understand the language". The calendar that teacher used was of an unspecified year, but not for 1982. Student asked teacher if he could write down that his birthday was on a Monday, because that was how it was for this year. Teacher replied, "No. Use this calendar so I will know whether you are right."

Soldiering and doubling up

Soldiering, or the deliberate pacing of work by a teacher to be minimally taxing on students, was a phenomenon evident in all classes observed. It was most commonly associated with 'individualized learning' where small numbers of students, grouped according to ability, were assigned a limited quantity of work that was usually accomplished well within the time given to a mathematics lesson. Furthermore, there was no coercion to have work completed. Because measurement activities, and also other mathematics, were so fragmented, students just progressed to a new activity or unit in the succeeding lesson.

Doubling up is a term given to students being permitted to work together on condition they are productive. The phenomenon was less evident in classes on measurement activities than in students' classrooms. In the teacher aide's classes, doubling up was not contingent upon production. In the lower grade classrooms, reference was often made to production as 'using your brains'. For example, the teacher interrupted two students: "Are you two working together? That's alright, but you both have to use your brains".

Workstoppages

There were two types of work stoppages observed: one in which students quietly did no work over the whole or major part of a lesson, and the other, protest stoppages, where students demonstrated that their assigned work was too difficult. In most cases observed, work stoppage was an individual or small group phenomenon.

There were many students who seemed compliant, in the sense that they were not disruptive, but they did little work. They generally followed the directions of the teacher as to being quiet or getting in lines. This type of resistance was largely tolerated by teachers.

Protest stoppages occurred at all grade levels, but in each case involved the 'low-ability' working class students. In each case there were elements of violence associated with students' frustrations over not being capable of completing assigned tasks. In a Grade 3/4 activity involved manipulating triangular shapes, one student threw his pieces down on the table and said that he would not do any more till he received help. He pushed his chair against the table, pushed the table in, put his head down on the table, then got up and left the group to play with blocks at another table. The teacher made no comment. Her response

strategy was to minimize the attention she gave to this student and endeavour to isolate him from contributing to more widespread stoppages. Teachers generally interpreted deviant behaviors in terms of concentration and emotional problems related to home deprivation.

Isolating problems

At all grade levels in the school there were students who were labelled as 'troublesome' and 'problem children'. This information was informally communicated between teachers, for example, over morning tea and lunch. Such information was used by teachers in staff discussions over the assigning of students to classes for the 1983 school year. These students were involved in important ways in how power was manifested by teachers in their classrooms.

A strategy that all teachers employed was to persistently focus attention on a small number of students so that they became the embodiments of deviancy. At the same time, teachers used their authority positions to socially isolate them. These actions were carried out with the consent of most students who saw the teacher as being fair. Furthermore, the actions were usually consented to by the 'troublesome' students themselves as they exploited opportunities for fun within the classroom system.

In its crudest form the isolation was physical, with students occasionally being sent, with their books, to a room adjacent to the principal's office, or to a section of their own classroom which represented their symbolic removal from the rest of the class. This was usually only a few feet away from other students, but the effect of a teacher's assigning of a 'troublesome' child to 'the mat' or 'the corner' was that they were given no further attention by either other students or the teacher.

Coloring-in the Day

A routine way of filling in time for students who had finished activities before others was for them to be engaged in coloring-in. In all classes in the school it was taken for granted that this was a useful activity. Students seemed to enjoy it and it provided a buffer time in which teachers could allow for individual rates of progress. It was often associated with the task being carried out, for example when children colored in various shapes already on their

worksheets. In the Greek bilingual class when addition exercises involving number sentences and their visual representation in triangles and circles had been completed, I observed children begin coloring-in these figures, without being directed by the teacher.

The children in the Greek class also exhibited another form of 'coloring-in' behavior by choosing a quiet activity. Such activities served the same purpose as the previously mentioned coloring-in tasks but were left open to student choice. The principle criterion appeared to be that the activity was of such a nature that it did not disturb either the teacher or other students from their 'work'. These activities served as rewards or incentives.

'Coloring-in' was sometimes designed as an integral part of an activity, and not just an addition for the 'quicker' or 'top' students. In these cases the 'coloring' took place either in the introductory or middle phase of a lesson. An example of this occurred in a spatial relations' lesson in Grade 5/6:

> Teacher explained that students would work on dinosaur tangrams, Tyrannosaurus Rex, which required five tangram sets. She gave directions: first, children were to color in the five tangram sheets that had been given out to each; secondly, cut the pieces and put them together to make dinosaurs; finally, they would glue the dinosaurs on large sheets and make a colorful class display.

The engagement of teachers in coloring-in was generally in a metaphorical sense, as they filled out the school day with extended news reports or 'morning talk' sessions, physical activities, and 'mathematical games.' Mathematics lessons were scheduled in most grades following a morning talk or news report period in which a variable number of students chose to speak on a topic of interest to them. Most students were very keen for the opportunity to talk in such a forum. Teachers frequently allowed these periods to extend into the time allocated for mathematics. Teachers of Grades 5/6 and 6 usually directed their students 'to run around the block' after morning assembly. This unscheduled activity also reduced mathematics classtime.

The Grade 2/3 teacher often colored-in the last 15 minutes of a

scheduled mathematics period with 'poison-ball', a group ball game unrelated to mathematics. She also organized Friday mathematics periods for mathematics games. As she explained:

> On Friday we just have maths games. I just grab a whole lot of maths games and we do that. I plan for an hour and it doesn't go for any less than half to three-quarters of an hour and often for the hour.

Bingo was a mathematics game, popular with students, and frequently used by teachers to color-in their mathematics classes.

Teacher absence

As well as using their relative autonomy in curriculum arrangements so that they could 'color in their days', teachers also used the increasing relaxation in their work conditions to take 'days off'. The principal commented on the rise in teacher absence:

> I think in recent years teachers are more conscious of their rights and less obsequious to the Education Department. Therefore they are going to use up their sick leave yearly rather than let it accumulate. Even the most professional and best teachers feel, if they seem a little bit sick, entitled to stay home rather than continue on as many of us of an older generation did. I do think it does affect the school though. We try though to pick the best emergency teachers - those most dedicated to the children. The school and the children lose something though.

All teachers took advantage of the leave conditions at some time during the year. Individual teacher absences ranged from 2 days to 40 days. The total number of leave days taken by the 13 full time teachers and the librarian who was on .5 time was 231. The mean number of teacher absences was 16.5 school days. This represented 8.9 percent of school days missed per teacher.

An effect of teacher absence was that emergency teachers were hired, often on the morning of the day on which leave was to be taken. In cases where emergency teachers could not be located, the classes were divided into small groups and assigned to other classrooms. In cases where the grade was split up and assigned to other classes, groups from that class did not attend measurement sessions in the

mathematics room. Where arrangements were made for emergency teachers, these teachers generally did not engage in measurement activities because of difficulties in organizing for material resources at short notice, and their perception that classes would be more manageable where they were engaged in pencil and paper tasks that involved routine procedures. The intended measurement program in the school suffered frequent discontinuities due to teacher absences.

Conclusions

Six specific conclusions to the study are detailed in Donovan (1983): classroom relations, social class differences between lower and upper school grades, the contestation within the occupational community over appropriate knowledge, parent participation and social class, and measurement as knowing and doing mathematics, and power and curriculum development. All bear on the theme, Beyond Academic Achievement, and have some overlap. In this paper I discuss two of these conclusions, parent participation and social class, and power and curriculum development, since these clearly point up differences in perspectives on curriculum implementation.

Parent participation and social class

The present study brought out clear social class differences in parental views of appropriate school knowledge and work. Middle-class parents saw school as a socialization agency and provider of 'enriched' curricula with opportunities for creativity and varied learning experiences. Working-class parents emphasized the importance of accepting authority, a moral code, and the learning of basic skills. The influence of middle-class parents was, however, much more dominant. They occupied all parent positions on the school council, assisted teachers in such programs as reading, and in particular developed the measurement program at the Humble Street school. Why, then, was the measurement program not implemented in a way that would have been consistent with middle-class interests, that is , more enriching, even if only for the 'more able students' who were predominantly middle-class?

The measurement program was directed at the needs of the 'disadvantaged' community and the subjective interests of middle-class parents. But the program was given meaning in an objective institutional context where its implementation was affected by the schools administrative arrangements and by the norms, beliefs, and behaviour patterns of its occupational community. The School Council viewed their curriculum role as setting out the school policy. One of the administrative matters on which they and the staff agreed was the maintenance of the tradition of one teacher to one class. This practice provided teachers with a relative autonomy which they might not otherwise have enjoyed. A consequence was that Special Needs programs and Supplementary Grants projects, such as the measurement program, were grafted on to the traditional arrangement in a way that fragmented both the regular agenda and additional programs. The School Council accepted that the management of curricula belonged to principal and staff. This division of rule, which was not well defined, meant that middle-class dominance of the School Council did not necessarily give them dominance of the classroom. Beliefs and practices of the occupational community, institutional arrangements, and the need for teachers to respond to the behaviors and resistances of working class students were more potent forces than the middle-class belief in, and pressure for, enrichment. Teachers believed in the importance of enrichment but their beliefs and practices within the context of Humble Street contained contradictions that further eroded possibilities for enrichment through 'Enrichment Mathematics'. Working-class students complied with more limited opportunities, the major resistance came from working-class students.

Power and curriculum development

There are implications from this study for curriculum policymakers and developers. These predominantly subscribe to a fidelity curriculum perspective in which the goal is to have individuals and organizations adopt innovations much as described by developers. Robitaille and Dirks (1982), for example, employ a model interrelating three elements: intended, implemented, and attained curriculum. In making suggestions to mathematics curriculum developers for 'improvements' they point to significant discrepancies between the elements. Weinshank, Trumbull,

and Daly (1983) focus on the role of the teacher in planned school change and suggest that teacher collegiality, expanded professional contacts, substantive inservice training, support of the principal, local adaptation of materials, and time to plan, implement and evaluate a curriculum are essential ingredients in sustaining change. Stephens (1982) suggests giving teachers a greater "sense of ownership and control over the curriculum" (p.249) by providing opportunities for them to collaborate with developers. In each of these conclusions the relationship of schooling to social-cultural conditions is taken for granted, and implementation is evaluated in terms of success in meeting knowledge criteria. The present study suggests that developers should recognize not only that mathematical knowledge is socially constructed, but that its distribution in school confers unequal benefits, and that these differential benefits are related to institutional arrangements and wider social-cultural conditions. Each of the authors mentioned above recognizes that teachers have power, but see it in pedagogical terms as being properly directed, through appropriate reflection, discussion, and input, toward desired attainment in school knowledge. This misses the fact that power is associated with much wider interests and in so doing helps legitimate differential benefits in schooling while engaging in discourse on more 'successfully' implementing curriculum through such means as collaboration, collegiality, distributing a 'sense of ownership', and participation. However, the ends toward which such 'power sharing' is directed with the dominant model of curriculum change leave unaddressed the fact that society is composed of relations of domination and subordination.

'Beyond academic achievement' may be seen as a positive response, although containing contradictions, to the social-cultural predicament of students as seen by teachers. Some researchers (e.g., Giroux, 1981) have begun to address the translation of such social-cultural awareness as 'Beyond academic achievement' into knowledge that will point to socially transformative action. Teacher unions in Australia have extended their role beyond promoting interests of wages and working conditions into the social-cultural issues of curriculum, such as the meanings and implications of ownership (cf. Report of the Monash Curriculum Conference for Parents and Teachers, 1980).

There is a strong tradition in schooling that knowledge is neutral in social-cultural terms. This has been particularly so in connection with mathematics education although in some recent publications (e.g. Romberg, 1983) it is discussed. Curriculum policymakers and developers may continue to ignore issues of power and differential benefits in relation to schooling. However others, including teachers and students particularly associated with working-class interests, will continue to be creative in ways that relate knowledge and work to their social-cultural predicament. Teachers occupy positions from which they have the potential power to implement curricula in a way that will not short-change their teaching yet provide for a more equitable distribution of knowledge. From the present study it is clear that teachers have a great deal of autonomy in curricular concerns. They were also conscious of political-schooling issues and their rights and responsibilities as employed. This political consciousness in industrial matters was not matched, however, by a political consciousness on curricular matters.

How may mathematics teaching and curriculum implementation relate to political consciousness? Two suggestions are made for doing this. The first is to reflect on practices through which knowledge is unequally distributed. In the classes in which the measurement program was taught, not only was knowledge distributed in a way that further disadvantaged the already disadvantaged
but it was also masked by such labels as 'child-centered' and 'individualized' learning, and descriptions of practices such as 'progress at your own rate'. The second suggestion is to reflect on the conditions for learning. The discourse at Humble Street on 'beyond academic achievement' did a disservice to the working-class students whom it was apparently serving. Rather than illuminating the academic competitiveness and unequal opportunities that existed, it clouded them. Students require good teaching in mathematics. They need basic skills. In learning mathematics they need to construct knowledge that will illuminate their lives and social predicament. Nevertheless, it is clear that schools are indeed social and political enterprises involving interests which cannot be taken for granted (Popkewitz et al., 1982).

Table 1: Percentages of students by social group and grade level at Humble Street School

Social group	Upper	Middle	Lower
Working class			
First generation Australians	53	53	45
Greek	37	39	25
non-Greek	16	14	20
Second generation Australians	30	32	27
'Trendies'	16	14	27

References

Anyon, J. Social class and the hidden curriculum of work. In H.A. Giroux, A.N. Penna and W.F. Pinar (Eds.), Curriculum & Instruction. Berkeley, CA: McCutcheon, 1980.

Anyon, J. Social class and school knowledge. Curriculum Inquiry, 1981, 11(1), 3-42.

Apple, M.W. Education and power. Boston, MA: Routledge & Kegan Paul, 1982.

Commission of Inquiry into Poverty. Poverty and education in Australia: Fifth main report. Canberra, Australia: Australian Government Publishing Service, 1976.

Connell, R.W., Ashenden, D.J., Kessler, S., & Dowsett, G.W. Making the difference: Schools, families and social division. Sydney, Australia: George Allen & Unwin Australia, 1982.

Donovan, B.F. Power and curriculum implementation: a case study of an innovatory mathematics program. Unpublished Ph.D. dissertation, University of Wisconsin-Madison, 1983.

Fullan, M., & Pomfret, A. Research on curriculum and instruction implementation. Review of Educational Research, 1977, 47, 335-397.

Giroux, H.A. Hegemony, resistance, and the paradox of educational reform. Interchange, 1981, 12 (2-3), 3-26.

House, E.R. The politics of educational innovation. Champaign, IL: McCutchan, 1974.

Keddie, N. Classroom knowledge. In M.F.D. Young (Ed.), Knowledge and control: New directions for the sociology of education. London: Collier-Macmillan, 1971.

Papagiannis, G.J., Klees, S.J., & Bickel, R.N. Toward a political economy of educational innovation. Review of Educational Research, 1982, 52, 245-290.

Popkewitz, T.S. The social contexts of schooling, change and educational research. Journal of Curriculum Studies, 1981, 13, 189-206.

Popkewitz, T.S., Tabachnick, B.R., & Wehlage, G. The myth of educational reform. Madison, WI: The University of Wisconsin Press, 1982.

Primary Mathematics Project Team. Mathematics curriculum guide - measurement: A manual for teachers. Melbourne, Australia: Curriculum Services Unit, Education Department of Victoria, 1981. (a)

Primary Mathematics Project Team. Mathematics curriculum guide: Spatial relations. Melbourne, Australia: Curriculum Services Unit, Education Department of Victoria, 1981. (b)

Report of the Monash Curriculum Conference: Who owns the curriculum? VTU Journal, November, 1980.

Robitaille, D., & Dirks, M. Models for the mathematics curriculum. For the Learning of Mathematics, 1982, 2(3), 3-21.

Romberg, T.A. A common curriculum for mathematics. In J. Goodlad and G. Festermacher (Eds.), Individual differences and the common curriculum. Chicago: The National Society for the Study of Education, 1983.

Schools Commission. Report for the triennium 1976-1978. Canberra, Australia: Australian Government Printing Service, 1975.

Schools Commission. Australian students and their schools. Canberra, Australia: The author, 1979.

Sharp, R., & Green, A. Education and social control: A study in progressive primary education. London: Routledge & Kegan Paul, 1975.

Shaw, K.E. Negotiating curriculum change in a college of education. In W.A. Reid and D.F. Walker (Eds.), Case studies in curriculum change. London: Routledge & Kegan Paul, 1975.

Stephens, W.M. Mathematical knowledge and school work: A case study of the teaching of Developing Mathematical Processes. (Technical Report). Madison, WI: Wisconsin Center for Education Research, 1982.

Weinshank, A.B., Trumbull, E.S., & Daly, P.L. The role of the teacher in school change. In L.S. Shulman & G. Sykes (Eds.), Handbook of teaching policy. New York: Longman, 1983.

Willis, P. Learning to labour. Westmead, England: Saxon House, 1977.